

CLAIMS

1. A method of correcting errors in a data block (164) having N rows and X columns, comprising:

- 5 performing a parity check for each one of said N rows of said data block (164);
performing a parity check for each one of said X columns of said data block (164);
identifying at least one bad byte for said data block (164);
identifying, from said parity check for each one of said N rows of said data block (164)
said check for each one of said X columns of said data block (164) and said at least one
10 identified bad bytes for said data block (164), at least one error in said data block (164); and
correcting each one of said at least one identified error in said data block (164).

2. The method of claim 1, wherein said at least one bad byte for said data block (164) is identified using an 8B/10B encoding/decoding process.

3. The method of claim 2, wherein N equals 32.

- 15 4. The method of claim 1, wherein each one of said at least one identified bad byte is located in one of said N rows of said data block (164).

5. The method of claim 4, wherein identifying at least one error in said data block (164) further comprises:

- 20 identifying at least one suspect bit for each one of said at least one bad byte of said data block (164), each one of said at least one identified suspect bit being located in one of said X columns of said data block (164); and

determining, for each one of said at least one suspect bit, if a parity bit for a corresponding one of said X columns of said data block (164) confirms that said suspect bit is suspect.

- 25 6. The method of claim 5, wherein correcting each one of said at least one identified error in said data block (164) further comprises:

for each confirmed suspect bit, determining if at least one additional bit in said corresponding one of said X columns of said data block (164) is also suspect; and

- 30 if no other bit in said corresponding one of said X columns of said data block (164) is also suspect, correcting said confirmed suspect bit.

7. The method of claim 4, and further comprising identifying at least one suspect bit for each one of said at least one bad byte of said data block (164), each one of said at least one identified suspect bit being located in one of said X columns of said data block (164).

8. The method of claim 7, wherein identifying at least one suspect bit for each one of said at least one bad byte for said data block (164) further comprises:

performing a parity check for each row of said data block in which one or more of said at least one bad byte is located; and

identifying suspect bits for each said parity checked row;

wherein said identified suspect bits for said parity checked row are said identified suspect bits for said bad byte.

9. The method of claim 8, wherein identifying at least one error in said data block (164) further comprises:

identifying at least one suspect bit for each one of said at least one bad byte of said data block (164), each one of said at least one identified suspect bit being located in one of said X columns of said data block (164); and

determining, for each one of said at least one suspect bit, if a parity bit for a corresponding one of said X columns of said data block (164) confirms that said suspect bit is suspect.

10. The method of claim 9, wherein correcting each one of said at least one identified error in said data block (164) further comprises:

for each confirmed suspect bit, determining if at least one additional bit in said corresponding one of said X columns of said data block (164) is also suspect; and

if no other bit in said corresponding one of said X columns of said data block (164) is also suspect, correcting said confirmed suspect bit.

11. The method of claim 10, and further comprising:

for each said corrected suspect bit, correcting said suspect bit of said parity byte for a corresponding row of said data block (164).

12. A method of correcting errors in a data block (164), comprising:

(a) identifying at least one suspect bit in said data block (164), each one of said at least one suspect bit indicating a possible error in said data block;

(b) classifying each one of said at least one suspect bit as either a confirmed error bit or as an unconfirmed error bit; and

(c) correcting each one of said at least one suspect bit classified as a confirmed error bit.

13. The method of claim 12, and further comprising:

(d) repeating (a) through (c) until all errors in said data block (164) have been
5 corrected.

14. The method of claim 12, wherein said confirmed error bits are identified using a combination of information derived from 8B/10B encoding/decoding of said data block (164), information derived from parity encoding along each row of said data block (164) and information derived from parity encoding along each column of said data block (164).

10 15. The method of claim 14, wherein identifying at least one suspect bit of said data block (164) further comprises identifying at least one bad byte of said data block (164) using information derived from said 8B/10B encoding/decoding of said data block (164).

16. The method of claim 15, wherein classifying each one of said at least one suspect bit as either a confirmed error bit or as an unconfirmed error bit further comprises:

15 identifying, using information derived from parity encoding of a row of said data block (164) in which a first one of said at least one bad byte is located, at least one suspect bit for said first one of said at least one bad byte.

17. The method of claim 16, wherein a first one of said at least one suspect bit for said first one of said at least one bad byte is classified as either a confirmed error bit or as an
20 unconfirmed error bit using information derived from parity encoding of a column of said data block (164) in said first suspect bit is located.

18. The method of claim 12, and further comprising the steps of:

applying a pre-selected number of iterations of an error-correction routine to said data block (164);

25 said error-correction routine being comprised of (a), (b) and (c).

19. The method of claim 18, wherein said pre-selected number is two.

20. The method of claim 19, wherein said confirmed error bits are identified using a combination of information derived from 8B/10B encoding/decoding of said data block (164), information derived from parity encoding along each row of said data block (164) and
30 information derived from parity encoding along each column of said data block (164).

21. The method of claim 20, wherein identifying at least one suspect bit of said data block (164) further comprises identifying at least one bad byte of said data block (164) using information derived from said 8B/10B encoding/decoding of said data block (164).

22. The method of claim 21, wherein classifying each one of said at least one suspect bit
5 as either a confirmed error bit or as an unconfirmed error bit further comprises:

identifying, using information derived from parity encoding of a row of said data block (164) in which a first one of said at least one bad byte is located, at least one suspect bit for said first one of said at least one bad byte.

23. The method of claim 22, wherein a first one of said at least one suspect bit for said first
10 one of said at least one bad byte is classified as either a confirmed error bit or as an unconfirmed error bit using information derived from parity encoding of a column of said data block (164) in said first suspect bit is located.